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09/872,891	05/31/2001	Sashikanth Chandrasekaran	OI7011112001	3158

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EXAMINER	
GOLD, AVI M	

ART UNIT	PAPER NUMBER
2457	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/872,891	CHANDRASEKARAN ET AL.	
	Examiner	Art Unit	
	AVI GOLD	2457	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 March 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-75* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-75* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This action is responsive to the RCE amendment filed on March 12, 2009. Claims 1, 14, 32-36, 40, and 54 were amended. Claims 67-75 were added. Claims 1-75 are pending.

Response to Amendment

Specification

1. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: computer program product of claims 32, 33, and 36.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 34, 35, and 40 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 34, 35, and 40 teach a system for distributing a workload, optimizing the distribution of a workload, and predicting the behavior of a workload across a plurality of nodes. Page 22, lines 6-7 of the specification disclose that the system can be embodied in software. The idea that the

system can be embodied fully in software and that the structure performs the means, in the claims, is software makes the system, software per se and non-statutory.

Claims 41-43, 71, 72, and 74 are necessarily rejected as being dependent upon the rejection of claims 34, 35, and 40.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-9, 11, 13-66 are rejected under 35 U.S.C. 102(e) as being anticipated by Ding et al., U.S. Patent No. 6,691,067.

Ding teaches the invention as claimed including monitoring of the state of a computer system and prediction of system performance (see abstract).

Regarding claims 1, 36, and 40, Ding teaches a method for predicting the behavior of a workload across a plurality of nodes, the method comprising:

a) receiving a workload to be executed (col. 5, line 65 – col. 6, line 13, Ding discloses a computer system having computer programs);

b) executing the workload on a single node before the workload is sent to a plurality of nodes for execution, wherein at least part of the act of executing is performed using a processor (col. 6, lines 14-32, Ding discloses executing software on the computer system before it is executed on other computer systems, the computer system being a node in a enterprise computing environment);

c) tracing the execution of the workload on the single node to identify a potential data conflict, wherein the potential data conflict comprises a potential conflict in the data (col. 6, lines 28-42, Ding discloses collecting and monitoring metric data on the computer system);

d) based on a result of the tracing, predicting the behavior of the workload across the plurality of nodes (col. 7, lines 6-15, col. 11, lines 11-32, Ding discloses prediction of the workload on multiple computer systems in the enterprise computing environment); and

e) outputting the prediction (col. 11, lines 30-31).

Regarding claims 2, 37, 41, 55, 60, and 65, Ding teaches the method, computer program product, and system of claims 1, 36, 40, 54, 32, and 35 wherein the action of identifying potential data conflicts comprises predicting how many data conflicts will occur (col. 7, lines 37-67, col. 11, lines 11-32, Ding discloses a baseline model constructed from collected data).

Regarding claims 3, 38, 42, 56, 61, and 66, Ding teaches the method, computer program product, and system of claims 1, 36, 40, 54, 32, and 35 wherein the action of identifying potential data conflicts comprise predicting types of data conflicts (col. 11, lines 11-54, Ding discloses various performance metrics).

Regarding claim 4, Ding teaches the method of claim 3 in which the types of data conflicts comprises a read-write conflict (col. 11, lines 11-54, Ding discloses performance metrics related to read/write).

Regarding claim 5, Ding teaches the method of claim 3 in which the types of data conflicts are based upon types of operations needed to resolve the data conflicts (col. 11, lines 11-54, Ding discloses critical performance metrics).

Regarding claim 6, Ding teaches the method of claim 3 in which the different types of data conflicts have differing levels of expense associated with operations needed for data conflict resolution (col. 11, lines 11-32, col. 13, lines 1-31).

Regarding claims 7, 57, and 62, Ding teaches the method and computer program product of claims 1, 54, and 32 in which the potential data conflicts are at the granularity of a data block (col. 11, lines 11-53, Ding discloses performance statistics and metrics that are of each data block).

Regarding claims 8, 39, 43, 58, and 63, Ding teaches the method, system, and computer program product of claims 1, 36, 40, 54, and 32 in which the potential data conflicts are identified based upon workload division between sessions (col. 11, lines 11-53, Ding discloses workload response time and throughput).

Regarding claim 9, Ding teaches the method of claim 1 further comprising:

f) selecting a number of nodes;

g) dividing the traced execution of the workload across the number of nodes (col. 6, lines 14-27).

Regarding claim 11, Ding teaches the method of claim 9 in which the number of nodes corresponds to an anticipated number of nodes for a distributed computing system (col. 6, lines 14-27).

Regarding claims 13 and 64, Ding teaches the method and computer program product of claims 1 and 32 in which the potential data conflicts are used to compute the costs of migrating the workload to a distributed system (col. 2, lines 41-48).

Regarding claims 14, 33, 34, and 54, Ding teaches a method, computer program product, and system for distributing a workload across a plurality of nodes, the method comprising:

a) receiving a workload to be executed (col. 5, line 65 – col. 6, line 13);

b) executing the workload on a single node before the workload is sent to a plurality of nodes for execution, wherein at least part of the act of executing is performed using a processor (col. 6, lines 14-27);

c) tracing the execution of the workload on the single node to identify a potential data conflict, wherein the potential data conflict comprises a potential conflict in the data (col. 6, lines 28-42);

d) based on a result of the tracing, predicting the behavior of the workload across the plurality of nodes (col. 7, lines 6-15, col. 11, lines 11-32); and

e) outputting the workload prediction scheme (col. 11, lines 30-31).

Regarding claims 15, 44, and 49, Ding teaches the method, computer program product, and system of claims 14, 33, and 34, wherein the forming the workload distribution scheme comprises determining workload distribution in manner which reduces the potential data conflicts (col. 11, lines 11-32, col. 21, lines 53-67, Ding discloses modifying a model of the enterprise).

Regarding claims 16, 45, and 50, Ding teaches the method, computer program product, and system of claims 14, 33, and 34, wherein the workload distribution scheme is based upon data accesses (col. 11, lines 11-54, Ding discloses response times, throughput rates, and paging rates).

Regarding claim 17, Ding teaches the method of claim 16 in which the workload is grouped in the workload distribution scheme to maximize intersection of data access on a same group of nodes (col. 11, lines 11-54, Ding discloses a baseline model constructed from collected data).

Regarding claim 18, Ding teaches the method of claim 16 in which the workload is grouped in the workload distribution scheme to minimize intersection of data access across different groups of nodes (col. 10, lines 25-32, Ding discloses metric groups collect from a node).

Regarding claims 19, 46, and 51, Ding teaches the method, computer program product, and system of claims 14, 33, and 34, wherein the workload distribution scheme is based upon access frequencies (col. 12, lines 22-44).

Regarding claim 20, Ding teaches the method of claim 19 in which data objects accessed by the workload are associated with weighting factors (col. 11, lines 11-54).

Regarding claim 21, Ding teaches the method of claim 20 in which not all the data objects are associated with same weighting factors (col. 11, lines 11-54).

Regarding claim 22, Ding teaches the method of claim 20 in which a weighted correlation is performed between the data objects and entities that access the data objects (col. 11, lines 11-32).

Regarding claim 23, Ding teaches the method of claim 22 in which the entities that access the data objects comprises sessions (col. 11, lines 11-32).

Regarding claim 24, Ding teaches the method of claim 22 in which subsets of the entities that access the data objects are grouped together (col. 11, lines 11-32).

Regarding claim 25, Ding teaches the method of claim 24 in which a data structure is employed to represent an affinity between one of the entities that access the data objects and another of the entities (col. 11, lines 11-32).

Regarding claims 26, 47, and 52, Ding teaches the method, computer program product, and system of claims 14, 33, and 34 in which the workload comprises data access upon one or more hierarchical objects (col. 11, lines 11-32).

Regarding claim 27, Ding teaches the method of claim 26 in which tracing the execution of the workload comprises tracing identifiers for the one or more hierarchical objects (col. 11, lines 11-32).

Regarding claims 28, 48, and 53, Ding teaches the method, computer program product, and system of claims 14, 33, and 34 in which tracing the execution of the workload comprises tracing identifiers associated with entities that access data (col. 11, lines 11-32).

Regarding claim 29, Ding teaches the method of claim 28 in which the entities comprise sessions (col. 11, lines 11-32).

Regarding claim 30, Ding teaches the method of claim 28 in which the workload distribution scheme distributes the workload based upon partitioning of the entities that access data (col. 11, lines 11-54, 13, lines 1-30).

Regarding claim 31, Ding teaches the method of claim 30 in which an association is formed between partitioning of the entities that access data and partitioning of one or more applications within the workload (col. 11, lines 11-32, 13, lines 1-30).

Regarding claims 32 and 35, Ding teaches a computer program product that includes a medium usable by a processor, the medium comprising a sequence of instructions which, when executed by said processor, causes said processor to execute a process for optimizing the distribution of a workload across a plurality of nodes, the process and system comprising:

a) receiving a workload to be executed (col. 5, line 65 – col. 6, line 13);

b) executing the workload on a single node before the workload is sent to a plurality of nodes for execution, wherein at least part of the act of executing is performed using a processor (col. 6, lines 14-27);

c) tracing the execution of the workload on the single node to identify a potential data conflict, wherein the potential data conflict comprises a potential conflict in the data (col. 6, lines 28-42);

d) based on a result of the tracing, predicting the behavior of the workload across the plurality of nodes (col. 7, lines 6-15, col. 11, lines 11-32); and

e) outputting the optimized distributed scheme (col. 11, lines 30-31).

Regarding claim 59, Ding teaches the method of claim 54 in which the potential data conflicts are used to compute costs of migrating the workload to a distributed system (col. 2, lines 41-48).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ding et al., U.S. Patent No. 6,691,067 further in view of Martin et al., U.S. Patent No. 6,154,813.

Ding teaches the invention substantially as claimed including monitoring of the state of a computer system and prediction of system performance (see abstract).

As to claims 10 and 12, Ding teaches the method of claim 9.

Ding fails to teach the limitation further including the use of modulo division to divide the traced execution of the workload across the number of nodes and the use of a modulo class to represent a node in the number of nodes.

However, Martin teaches a cache management scheme for continuous media data, such as audio or video (see abstract). Martin teaches the use of modulo division (col. 4, lines 1-15, col. 5, lines 46-63).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Ding in view of Martin to use modulo division and a modulo class in association with nodes. One would be motivated to do so because they are efficient ways of organizing nodes.

7. Claims 67-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ding et al., U.S. Patent No. 6,691,067 further in view of Galles et al., U.S. Patent No. 5,664,151.

Ding teaches the invention substantially as claimed including monitoring of the state of a computer system and prediction of system performance (see abstract).

As to claims 67-75, Ding teaches the method, computer program product, and system of claims 1, 14, 32-36, 40, and 54.

Ding fails to teach the limitation further including the potential conflict in the data involves a block ping.

However, Galles teaches a system and method of managing read resources in a multiprocessing environment (see abstract). Galles teaches the use of cache coherency which makes sure there isn't a block ping and errors with caching that are block pings (col. 1, lines 40-47, col. 5, lines 15-34).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Ding in view of Galles to use a block ping as a potential conflict in the data. One would be motivated to do so because it is a known data conflict that a workload behavior predictor would monitor.

Response to Arguments

8. Applicant's arguments with respect to claims 1-75 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Pat. No. 6,427,166 to Hurst et al.

U.S. Pat. No. 5,928,344 to Stierli.

U.S. Pat. No. 6,681,251 to Leymann et al.

U.S. Pat. No. 6,442,564 to Frey et al.

U.S. Pat. No. 5,819,033 to Caccavale.

U.S. Pat. No. 5,937,165 to Schwaller et al.

U.S. Pat. No. 5,271,000 to Engbersen et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AVI GOLD whose telephone number is (571)272-4002. The examiner can normally be reached on M-F 8:00-5:30 (1st Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Etienne can be reached on 571-272-4001. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Avi Gold

Patent Examiner

Art Unit 2457

/Salad Abdullahi/
Primary Examiner, Art Unit 2457